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Canadian Patents Database

(12) Patent:

(11) CA 890260

(54) SIDE-LOADING REFUSE VEHICLE

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ABSTRACT:

CLAIMS: [Show all claims](#)

*** Note: Data on abstracts and claims is shown in the official language in which it was submitted.

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SIDE-LOADING REFUSE VEHICLEABSTRACT OF THE DISCLOSURE

A vehicle having a side-loading bucket assembly. The bucket is mounted on arms attached to a shaft which pivots to move the bucket from a lower material-receiving position to an upper material-discharging position. The bucket is capable of limited rotation with respect to its mounting arms when it reaches the discharging position in order to compress the material in the vehicle. A locking mechanism normally holds the bucket in a fixed position with respect to its mounting arms and this mechanism is automatically released when the bucket reaches the discharging position. A hold down bar is normally positioned to retain material in the vehicle and is retracted out of the path of the bucket as it reaches its material-discharging position.

Brief Description of the Invention

This invention relates to a self-loading refuse vehicle and, in particular, such a vehicle having a side mounted loading bucket.

Self-loading refuse vehicles are known. Such vehicles are usually provided with a body in which there is a closed refuse receiving compartment and an automatic refuse loading and compressing assembly. A commonly used refuse loading and compressing assembly forms a tailgate at the rear 10 of the body and is hinged at an upper point of the body so that the assembly may be rotated out of the way by hydraulic cylinders when the vehicle is being emptied. The assembly includes a refuse receiving bucket and an arm and scraper to force the material from the bucket into the vehicle body. The loading and compressing assembly is large and complex.

Another type of loading and compressing assembly utilizes a bucket mounted for pivotal movement at the ends of large hydraulically operated booms. The booms, raise the bucket which is then tipped by a suitable mechanism to empty 20 its contents. Such an assembly may be side or rear mounted. Still another type of assembly makes use of cables and a bucket which runs on wheels guided by tracks positioned at the side of the vehicle body. These two latter types do not compress the material once it is deposited in the vehicle body.

The apparatus of the present invention provides a relatively light-weight refuse vehicle capable of being fabricated in a straight forward manner and easily operated. The side loading bucket assembly of this invention provides compression of the material stored in the vehicle body.

30 Summary of the Invention

The present invention comprises a vehicle having a bucket assembly which includes a bucket, means for mounting the bucket for pivotal movement about a first longitudinally



extending axis between a lower receiving position and an upper discharge position. Locking means are provided which normally retain the bucket in a fixed position with respect to the bucket assembly and a vehicle mounted actuating means contacts the locking means in the upper discharge position to release the bucket for rotation with respect to the bucket assembly in order to compress the material in the vehicle.

In the present invention, the bucket may be regarded as forming a portion of the side wall and roof of the vehicle body. A longitudinally extending shaft mounted on the side of the vehicle has a plurality of radially extending arms at the ends of which the bucket is pivotally mounted. A locking means between the bucket and one of the arms fixes the bucket position with respect to the arms. When the locking means is released the bucket is free to rotate with respect to the arms in such a way that it will compress the refuse in the vehicle.

Brief Description of the Drawings

Figure 1 is a perspective view of a vehicle using the present invention with the bucket in a material-compressing position;

Figure 2 is a view showing the bucket actuating mechanism;

Figure 3 is a cross-sectional view taken along line 3-3 of Figure 1;

Figure 4 is a cross-sectional view taken along line 4-4 of Figure 1 showing the bucket in loading, intermediate and discharge positions; and

Figure 5 is a cross-sectional view taken along the seam line as Figure 4 showing the bucket in two material-compressing positions.

Description of the Preferred Embodiment

With reference to Figure 1 there is illustrated a truck 10 having a conventional cab 11 which houses a prime mover connected to a power drive train to power the rear wheels. Pivotally mounted to a main frame 13 of the truck is a secondary frame 14 to which a body 15 is fixed. The body may be raised by suitable hydraulic cylinders (not shown) to empty any material contained therein through doors 27 and 28 in rear wall 19.

Body 15 consists of a front wall 16, side walls 17 and 18, rear wall 19, a floor 20 and roof 21 so that a closed material receiving compartment is formed. Wall 19 includes a pair of doors 27 and 28 mounted on lugs 29 and 30, respectively, for loading and unloading material. A tailgate 31 forms the lower portion of rear wall 19. The body may typically be formed of tubular steel posts 25 to which sheet metal plates 26 of suitable size are welded.

A portion of wall 18 together with a portion of roof 21 define an aperture which receives the material loading and compressing bucket. As illustrated in Figures 1, 4 and 5, wall 18 includes sections 18a and 18b and roof 21 includes sections 21a and 21b, sections 18a,b,21a and 21b, in fact, forming a bucket of unitary construction. These wall sections are constructed in the same manner as the remainder of the body. The bucket will hereinafter be referred to by reference numeral 35. At both ends of the bucket, sheet metal plates are attached to form a material receiving compartment 37.

Bucket 35 has a pin 38 extending longitudinally away from the bucket at one side thereof adapted to cooperate with cam groove 39 formed on the inside of front wall 16 of body 15. Cam groove 39 has a horizontal cam groove portion 40 and an upwardly extending cam groove portion 41.

As can best be seen in Figures 3 and 4 pairs of outwardly extending lugs 44 are welded at the upper ends of the steel posts

25 of wall portion 18a. These lugs are also welded to a longitudinally extending rod 45. The rod 45 is journaled in bearing portions 46 located between lugs 44 at one end of several arms 47. The other end of each arm 47 is welded to a longitudinally extending shaft 50 journaled in bearings 51 fixed to wall 18.

Position A of Figure 4 shows the lower refuse receiving position and position C shows the upper discharge positions of bucket 35. It will be apparent that the bucket is capable of pivoted movement about a first longitudinally extending axis, that is, shaft 50, between a lower receiving position (A) and an upper discharge position (C). It will also be apparent that the bucket is capable of rotation about a second longitudinally extending axis, that is, rod 45. Rotation about rod 45 is used to perform a compressing operation which is described later.

With reference to positions A and B illustrated in Figure 4 it can be seen that bucket 35 will tend to rotate in a clockwise direction, about rod 45, under the influence of gravity. To prevent such rotation, a locking means is provided to maintain the bucket fixed with respect to the assembly, particularly arms 47. This locking means comprises a lever 54 having one end mounted for pivotal movement about a pin 55 located at the front end of section 21a. Fixed to the other end of lever 54 is a locking pin 56 which engages a locking lug 57, fixed to arm 47 adjacent front wall 16. An abutment 58 fixed to front wall 16 is provided to engage lever 54 as bucket 35 reaches position C and thus releases pin 56 from engagement with lug 57. A spring 59 is provided to bias the lever 54 towards a position where pin 56 is kept in engagement with lug 57.

Figure 2 illustrates the actuating mechanism 70 for the bucket assembly. The actuating mechanism is mounted on the external surface of front wall 16 between the cab 11 and body 15. It includes a hydraulic cylinder 71 having fluid lines 72 and 73 for actuating the cylinder under the control of valves (not shown) actuated by control levers 74. Extending from cylinder 71 is a

piston rod 75 having an end attached to a bracket 76. Two pulleys, 77 and 78, are journaled in bracket 76. A cable 80 has one end 81 fastened to a bracket 83 and its other end 82 fastened to a second bracket 84. The intermediate portion of cable 80 is wound around pulley 77, a first idler pulley 86, a wheel 87 fixed to shaft 50, a second idler pulley 88, and pulley 78 to bracket 84. Thus, any movement of piston rod 75 will cause wheel 87 to rotate which in turn will rotate shaft 50 and move bucket 35 accordingly.

To prevent material falling out the opening in body 15 when the bucket 35 is in its lowered material receiving position (A), a longitudinally extending holddown bar 90 is provided. Bar 90 is attached to a pair of arms 91 which are attached to a rotatable shaft 92. Shaft 92 is mounted inside side wall 17 and extends partially outwardly through an opening in front wall 16. A crank-arm 93 is fixed to the external extension of shaft 92. A chain 94 connects crankarm 93 to wheel 87. The chain is fastened eccentrically to the wheel. In this manner the wheel serves to rotate shaft 92 which will raise or lower bar 90.

Operation

When piston rod 75 is in its fully retracted position, bucket 35 is in the material receiving position (A). When the bucket is to be emptied the hydraulic cylinder is actuated and the piston rod moves outwardly. It will be noted that, before actuation of the hydraulic cylinder, the holddown bar 90 is in the position indicated by the dot-dash lines in Figure 2. As piston rod 75 moves outwardly, wheel 87 will rotate in a counter-clockwise direction with reference to the view of Figure 2. This movement causes chain 94 to rotate crankarm 93 and shaft 92 in a counter-clockwise direction to move holddown bar 90 out of the path of travel of bucket 35.

It will be clear that the time interval for the bar 90 to move from the dot-dash position to the full line position of Figure 2 is a function of the length of crankarm 93 and the distance

between the axis of rotation of wheel 87 and the point at which the chain is fastened. The time interval may be adjusted accordingly. Preferably, shaft 50 extends forwardly so that chain 94 wraps around this extension during the compression operation.

As the bucket moves from position A to position C through position B it will be noted that it remains fixed with respect to arms 47. Once the bucket has rotated through 180°, abutment 58 engages lever 54 and further rotation will serve to release the locking pin from engagement with locking lug 57. In
 10 position C the bucket has been emptied. Further rotation in a counter-clockwise direction begins the compressing operation. The pin 38 engages the horizontal cam groove portion 40. The bucket, now released, rotates about rod 45. Figure 5 shows two positions D and E during the compressing operation. It will be noted that section 18a is displaced much more in the horizontal direction than pin 38 thereby forcing the lower portion of the bucket to move ahead of the upper portion to compress the material in the body.

On retraction of piston rod 75 bucket 35 rotates in a
 20 clockwise direction. In position C the locking pin 56 and locking lug 57 re-engage due to the force applied by spring 59. If no further loading is required the bucket 35 remains in position C and forms part of the wall 18 and roof 21.

Thus there has been described a new and useful refuse vehicle. It will be clear that the portion of the vehicle body lying above and including shaft 50 and bearings 51 can be removed thus leaving an ordinary truck body for use as required. While a preferred embodiment of the invention has been described, obvious variations in the disclosed structure can be made within
 30 the scope of the appended claims.

For example, the edge of the bucket formed by wall section 18a can be serrated to aid in the compressing operation. Specifically, a plurality of V-shaped teeth-like elements 42 may

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be fixed to the lower end of wall section 18a (as viewed in position C of Figure 4).. Elements 42 increase the amount of material which can be compressed during the compression operation by preventing refuse from falling out of the path of the bucket during this operation. Double cables may be used in those portions of the actuating mechanism of Figure 2 which are under tension in raising the loaded bucket. Clearly the form of cam groove 39 can be varied and still provide for the compressing action by the bucket. Although in the particular 10 embodiment described, the hold down bar extends above the truck body during the compressing operation it is possible to arrange for this bar to remain within the truck body during the compressing operation.

CLAIMS

1. In a self-loading vehicle,
a bucket assembly including a bucket,
means mounting said bucket assembly for pivotal
movement about a longitudinally extending axis between a lower
material-receiving position and an upper material-discharging
position,
locking means normally retaining said bucket in a
fixed position with respect to said bucket assembly, and
vehicle mounted actuating means contacting said
locking means in said upper discharge position whereby said
bucket is released to pivot with respect to said bucket assembly
and compress material in said vehicle.
2. Apparatus as set out in claim 1 further comprising
guide means mounted on said vehicle and cooperating with said
bucket to determine the amount of pivotal movement of the
bucket during the compressing operation.
3. Apparatus as set out in claim 2 wherein said bucket
is carried by arms extending from a shaft positioned along
said longitudinally extending axis.
4. Apparatus as set out in claim 3 wherein said locking
means comprises a lever having one end pivotally mounted to
said bucket and the other end cooperating with an abutment form-
ed on one of said arms.
5. Apparatus as set out in claim 4 wherein said actuating
means comprise a projecting arm attached to a wall of the vehicle
and adapted to engage with said lever in the discharge position
of said bucket to move said other end of the lever away from its
cooperating abutment.

6. Apparatus as set out in claim 5 wherein said guide means is attached to a wall or the vehicle, a projection being formed at one side of said bucket to cooperate with said guide means as the bucket moves to the discharge position whereby the bucket is tilted to advance the lower portion further into the body of the vehicle.
7. Apparatus as set out in claim 3 further comprising hydraulic means for actuating said shaft.
8. Apparatus as set out in claim 7 further comprising a hold down bar operatively connected to said shaft to be retracted in the bucket material-discharge position.
9. Apparatus as set out in claim 7 wherein said hydraulic means comprises a hydraulic cylinder having a pair of pulleys mounted on the piston thereof, a pulley wheel mounted on the end of said shaft and a cable fastened to the vehicle body at one end and passing around one of said pulleys, said pulley wheel and the other of said pulleys and also fastened at its other end to the vehicle body whereby actuation of the piston causes rotation of said shaft.
10. Apparatus as set out in claim 4 wherein said locking means retain said bucket abutting against said arms and the bucket is free for rotation in one direction only when the locking means is released.
11. A self-loading vehicle comprising,
 - a longitudinally extending shaft mounted on a side wall of the vehicle body,
 - a bucket assembly having a lower material-receiving position and an upper material-discharging position,
 - said assembly including,
 - a plurality of arms each having one end fixed to said shaft and extending radially therefrom,

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a bucket mounted for rotation about an axis extending through the other ends of said arms and having a projection formed at one side thereof,

locking means, normally retaining said bucket in a fixed position with respect to said bucket assembly, comprising,

a lever having one end pivotally mounted to a side of said bucket and a pin extending from the other end to cooperate with an abutment formed on one of said arms,

an actuating means comprising,

a projecting arm attached to a wall of said vehicle and adapted to engage said lever when said bucket is in said upper material-discharging position to move said pin away from said abutment,

a cam groove formed in a wall of said vehicle body to cooperate with said projection on said bucket as said bucket moves to the discharge position whereby said bucket is tilted to advance its lower portion further into the vehicle body,

hydraulic means for actuating said shaft including, a hydraulic cylinder,

a pair of pulleys mounted on the piston rod thereof,

a pulley wheel mounted on the end of said shaft,

and a cable fastened to the vehicle body at one end and passing around one of said pulleys, said pulley wheel, and the other of said pulleys and fastened to the vehicle body at its other end,

and a hold down bar connected to said pulley wheel to be retracted in the material-discharging position of said bucket assembly.



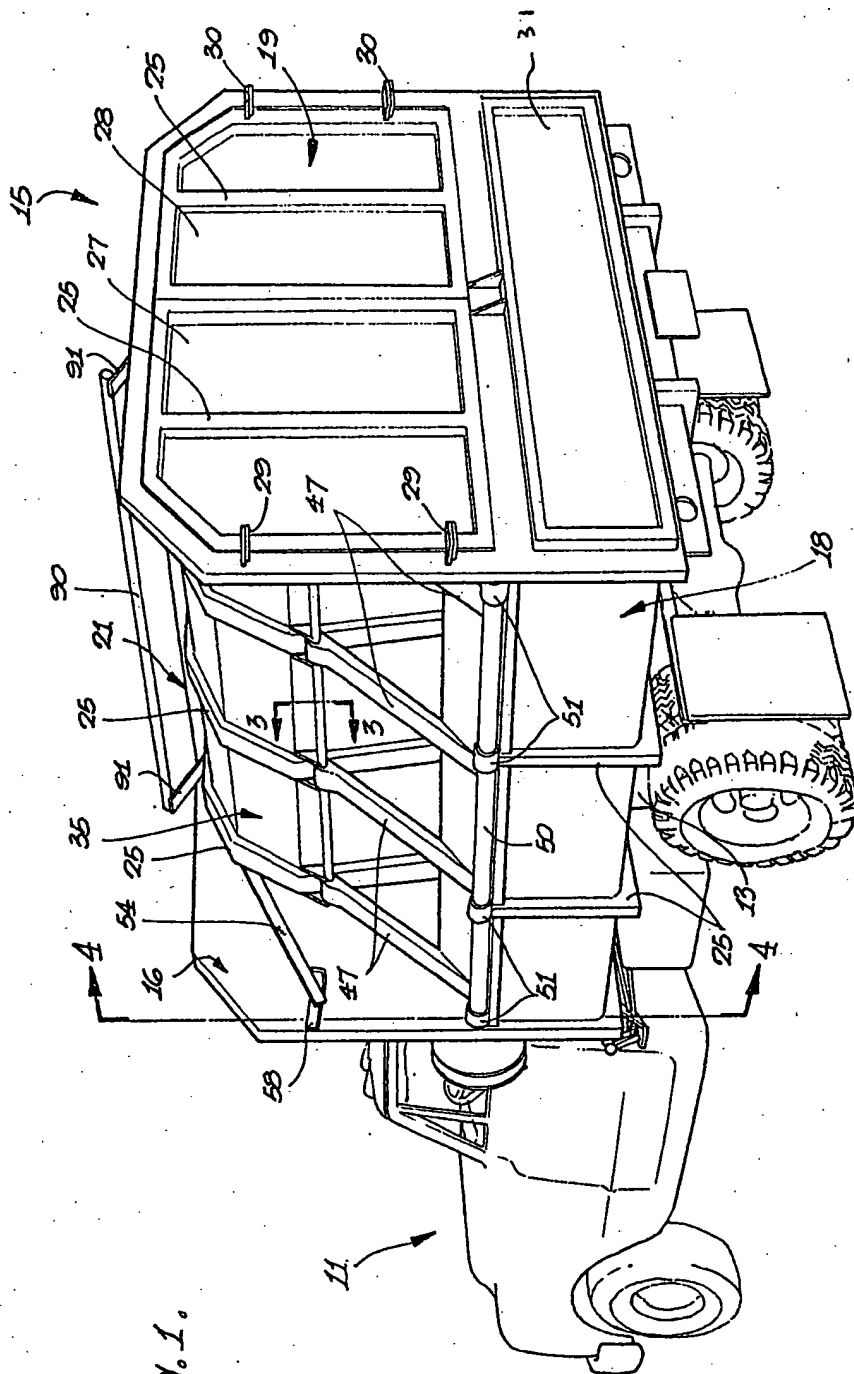


Fig. 1.

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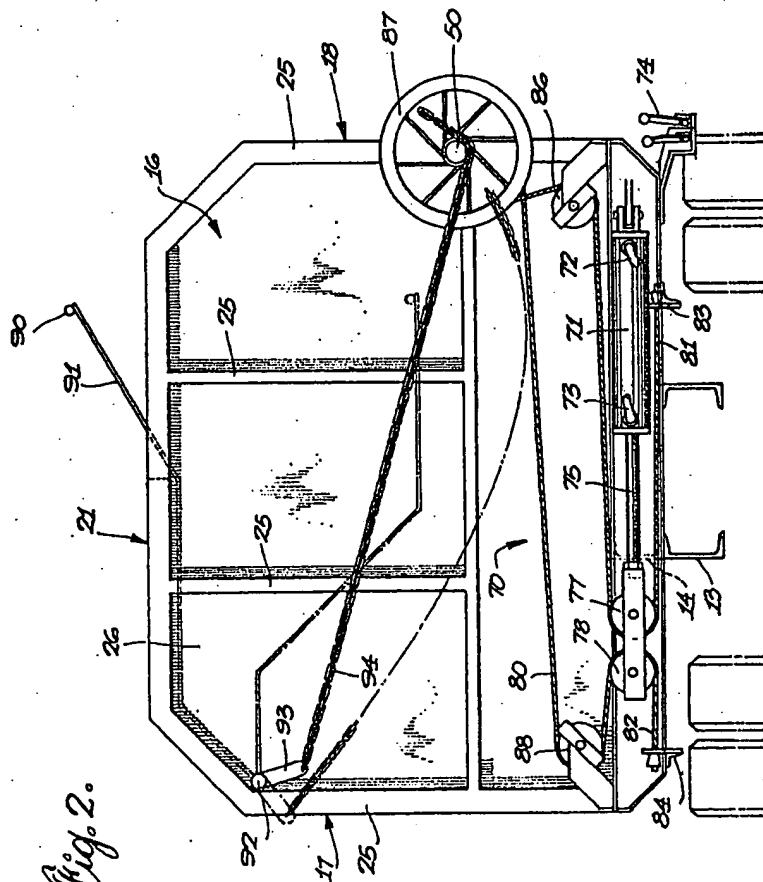


Fig. 2.

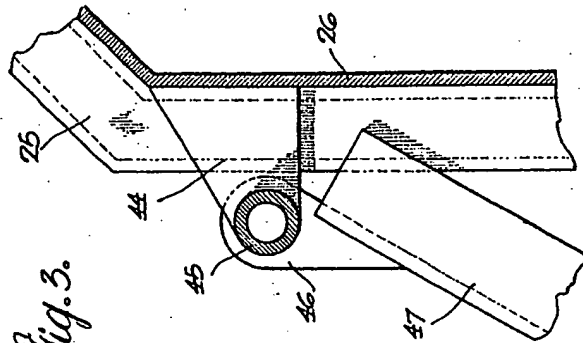
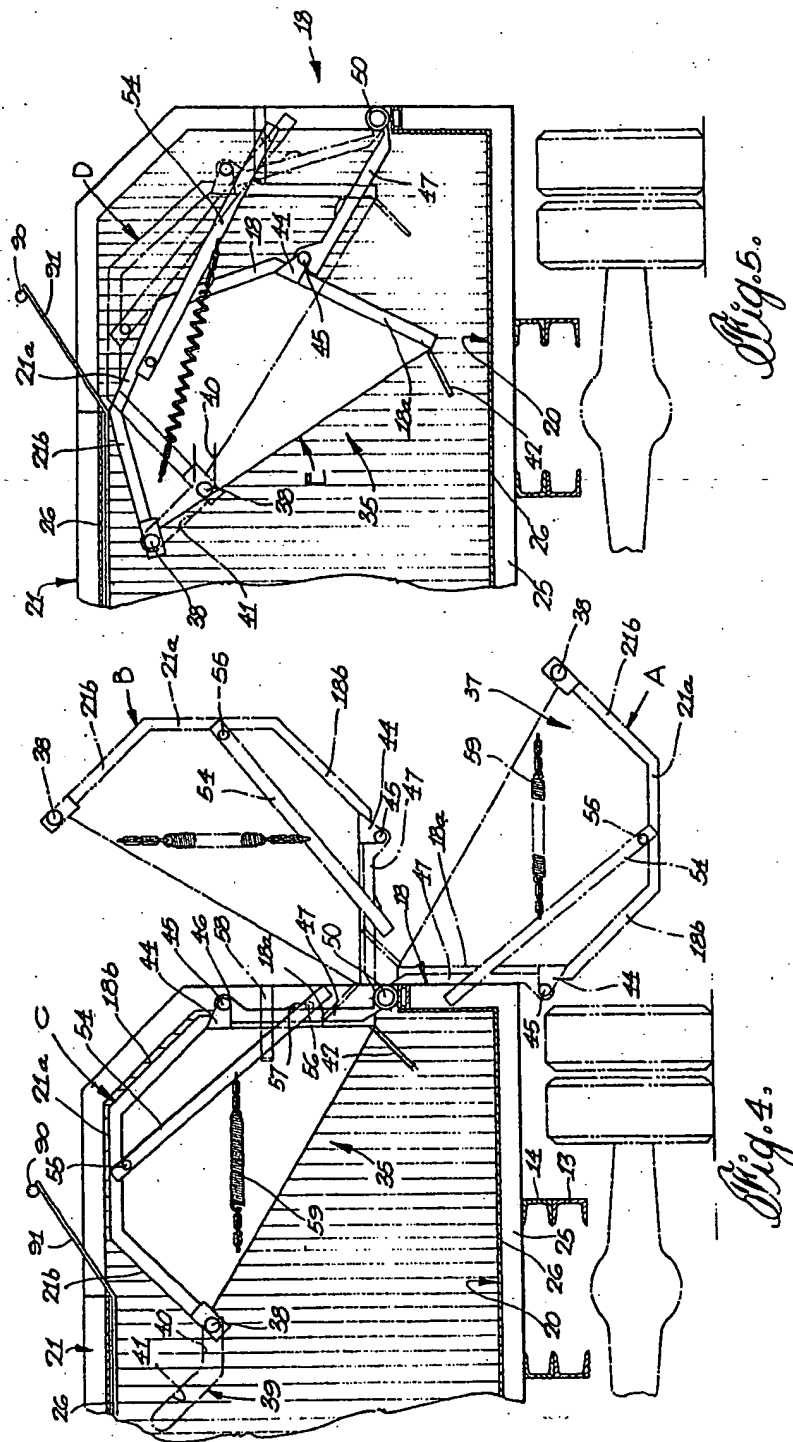


Fig. 3.

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